

## **ACTION MEMORANDUM**

**SUBJECT:** Action Memorandum for a Non-Time-Critical Removal Action at U.S. Government Moorings, Portland Oregon

### **I. PURPOSE**

The purpose of this Action Memorandum is to document the decision to approve the proposed erodible soil cleanup action described herein for the U.S. Government Moorings (Moorings) Site, Portland, Oregon. This removal action is necessary to address contaminant source control to the Willamette River and the Portland Harbor National Priorities List (NPL) site in order to reduce the risk to the public and the environment from the hazardous substances at the Moorings site. This removal action will address the unacceptable risks documented for the Uplands Erodible Soils Area.

### **II. SITE CONDITIONS AND BACKGROUND**

#### **A. Site Description**

This is a non-time-critical removal action to address impacted upland erodible soils at the Moorings facility on the Willamette River in Portland, Oregon. Figure 1 depicts the site vicinity.

The Moorings is a 13.14 acre facility owned and operated by the U.S. Army Corps of Engineers (USACE), Portland District that serves two primary functions. Since 1903, the site has served as ship maintenance and berthing facility for the Portland District dredges, and hydrosurvey vessels. The site also serves as the Portland District Warehouse. Submerged land in the Willamette River is partially covered by 26,700 square feet of dock. Figure 2 depicts the current physical layout of the site.

The Moorings is located within a reach of the Willamette River identified by the U.S. Environmental Protection Agency (USEPA) as a Superfund site under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). The Portland Harbor Superfund site assessment area extends from approximately river mile (RM) 0/1 to 12, which includes part of the Multnomah Channel and includes upland portions of properties that have or could impact river sediments. The Portland Harbor Superfund site was listed on the NPL on December 1, 2000 (65 Federal Register 75179-01).

The reach of the Willamette River within the Portland Harbor Superfund site has served as a major industrial waterway since the early 1900s. The river is also habitat to wildlife, numerous fish, shellfish, and other aquatic species, including salmonid species listed under the Endangered Species Act. Additionally, several tribes have treaty-reserved rights and resources in the harbor. The USEPA has named USACE, along with approximately 145 other parties, as potentially responsible for contamination in the harbor.

## **1. Removal Site Evaluation**

The USACE conducted a Remedial Investigation (RI) to determine the human and environmental risks from upland contamination at the Moorings, and to identify sources of contamination to the harbor. The USACE also documented sediment contamination at the Moorings to complete data needs for the harbor wide RI being completed by other PRPs under the oversight of USEPA.

The Moorings RI, completed in May 2010 revealed the presence of contaminants in Moorings groundwater, sediments, and in erodible soils along the bank of the Moorings at elevated concentrations relative to Federal and State guidelines and standards. Site characterization studies summarized in the RI indicated that the Moorings is likely contributing contaminants to the Willamette River as a result of groundwater conveyance and erodible soils.

The RI revealed the presence of contaminant concentrations: (1) in erodible soils above Oregon Joint Source Control Strategy Screening Level Values (JSCS SLVs) associated with Willamette River ecological receptors, and (2) in groundwater that produced elevated risk in potential exposure scenarios for future site occupants and riverine ecological receptors. Evidence presented in the RI suggests that the source of the groundwater contamination continuously entering the Moorings and discharging to the Willamette River is from the neighboring GASCO property.

Impacted soils are primarily located in unpaved areas near the top of the river bank associated with storage of equipment and materials used at the Moorings facility. The RI identified two areas called the Fence Line and North Logistics Area that could potentially erode into the river and be a contaminant source to river sediments being considered for remediation under the ongoing Portland Harbor NPL site Feasibility Study.

Following completion of the RI, an Upland Feasibility Study (FS) was completed in April 2012 to evaluate potential remedial technologies and alternatives to mitigate risks from contaminated erodible soils at the site. This Action Memorandum addresses only erodible soils, which represents contamination resulting from activities at the Moorings site. Since the source of groundwater contamination is the former GASCO site, USACE is working with USEPA and the Oregon Department of Environmental Quality (ODEQ) to have the current GASCO property owner (NW Natural) address that contamination. Moorings sediment contamination is being evaluated through the Portland Harbor Feasibility Study.

## **2. Physical Location**

The Moorings is located on the west bank of the Willamette River at approximately RM 6.08 through 6.21, within the industrial harbor of Portland, Oregon (Figure 1). The site address is 8010 Northwest St. Helens Road, Portland, Oregon, and is owned and operated by the USACE, Portland District. The site is bounded on the northeast by the Willamette River, on the northwest by Advanced American Construction, on the southwest by BNSF Railway and St. Helens Road, and on the southeast by the GASCO property (currently owned by NW Natural), which also includes Koppers and Siltronic activities. The GASCO facility was a producer of Manufactured Gas Products (MGP).

### 3. Site Characteristics

The Moorings consists of 13.14 acres on the bank of the Willamette River. Submerged land is partially covered by 26,700 square feet of dock. Figure 2 depicts the current physical layout of the site. The Moorings site was divided into two sections for the purpose of the RI based on differences in site uses and fill history: the Industrial Area and the multi-increment sampling (MIS) Area. The Industrial Area is located on the southern portion of the site where the majority of light industrial activities occurred. Part of the Industrial Area was filled during the early history of the site. The MIS Area is located in the northern portion of the site and was historically used as a storage and warehouse area for dredge parts.

Approximately one-half of the Industrial Area on the southern end of the property is paved or covered by buildings. The land surface in the MIS Area northwest of Building 17, is either covered by buildings, compacted gravel, pavement or concrete.

In general, the site slopes from southwest to northeast with a local relief of approximately 9 feet with a land surface elevation of 30 feet above mean sea level (msl) for most of the site.

The majority of the riverbank at the site is a 1.5:1 riprap-covered slope with a timber bulkhead at the toe of the slope, generally following the historic shoreline. Average river stages for the area range from 8.0 feet Columbia River Datum (CRD) in August and September to 12.5 feet CRD in May and June. The in-water vertical datum used at this site is the CRD, which was also established for the Portland Harbor Superfund site. The upland vertical datum is the National Geodetic Vertical Datum of 1988 (NGVD88), which is equivalent to msl. The CRD is approximately 4 to 5 feet below the NGVD88. The staff gauge at the Moorings reports river stages in CRD, and is located northwest of the small boat dock (Dock B) (Figure 2).

The site initially consisted of six acres of uplands on the south and west side of the property. Land purchases and filling projects dating from 1903 through 1948 resulted in northward and riverward expansion of the site. Most of the current facilities were constructed by 1945 with some modifications over time. The creosoted timber dock was rehabilitated in 1967.

As discussed in Section 1, the Moorings RI identified the following types, quantities, and locations of contaminants.

- Groundwater exceeds SLVs and Safe Drinking Water Act Maximum Contaminant Levels (SDWA MCLs) in the southeastern corner of the Site and may be discharging to the river.
- Potential future exposure of Maintenance Workers and Office Workers to site groundwater represents an unacceptable risk.
- Erodible soils along the riverbank exceeded JSCS SLVs at the northeastern corner of the Site which presents a potential source of contamination to the river at concentrations that may have negative impacts to ecological receptors.

All contaminants exceeding screening level values were carried forward as Contaminants of Concern (COCs) to ensure sources to the Willamette River are addressed in advance of the Portland Harbor Record of Decision (ROD).

The RI revealed that contaminated groundwater is entering the Moorings Site from sources located at the neighboring GASCO property. Although the RI identified groundwater concentrations presenting a risk, this contamination is not addressed in this Action Memorandum. Information about the COCs and risks from the erodible soils is discussed in Section 4 below.

#### **4. Release or Threatened Release into the Environment of a Hazardous Substance, or Pollutant or Contaminant**

This Action Memorandum addresses the threat of release to the river of CERCLA hazardous substances from the potential erosion of upland soils. The threat of release of CERCLA hazardous substances from groundwater are not addressed in this action as the USACE is working with USEPA and ODEQ to have the GASCO property owner address that contamination. In the interim, the USACE is implementing Institutional Controls (ICs) to prevent access to the groundwater by individuals that may be on the Moorings site. The erodible soil removal is focused on contaminants that pose the greatest potential risk to ecological receptors in the river.

A conceptual site model summary is presented below.

##### ***Conceptual Site Model Summary***

The following points summarize the conceptual model for the site.

- Two known sources of contamination exist at the site.
  - Soil contaminated with PAHs, metals, PCBs and pesticides has accumulated near the top of the riverbank.
  - Shallow groundwater contaminated with cyanide, PAHs, and metals are present beneath the southern portion of the property.
- The upland soils have the potential to erode to the river sediment via overland transport.
- Groundwater has the potential to release to the river.

##### **Summary of Site Risks**

A Human Health Risk Assessment (HHRA) and an ecological screening evaluation were completed as part of the RI. The HHRA assumed future site use would remain as industrial use by the Federal Government. No Ecological Risk Assessment was completed as part of the RI due to the lack of both habitat and terrestrial receptors. The potential risk to aquatic receptors will be evaluated as part of the harbor-wide ecological risk assessment being conducted under USEPA supervision.

## Human Health Risks

The HHRA presented in the RI evaluated the potential for human health impacts associated with environmental contaminants detected at the Site. The risk assessment *provides* a chemical- and site-specific risk analysis, assuming that no remedial actions are conducted. Contaminants that were detected at levels that exceeded SLVs were designated as Contaminants of Potential Concern (COPC). COPCs for risks associated with direct exposure to surface/shallow soil were identified by comparing analytical results for soil/upland sediment samples to USEPA Region 6 Preliminary Remediation Goals (PRGs) for industrial soils. COPCs for risks associated with direct exposure to water were identified by comparing RI data to drinking water MCLs and USEPA Region 6 Preliminary PRGs for tap water.

Results of the HHRA indicate that if, in a future scenario, groundwater was used as a drinking water source, it would present a cumulative cancer risk and hazard indices that would be above the level of concern and would present potential human health concerns to maintenance workers and office workers. The following groundwater constituents are associated with a risk to human health greater than  $1 \times 10^{-4}$  or a hazard quotient greater than 1:

- Cyanide
- Benzo(a)pyrene
- Metals - aluminum, manganese, and arsenic

Although the RI found PAHs, metals and PCBs and DDT above SLVs for human health, a risk calculation did not find a risk to human health from the upland soils. Erodible soils do contain bioaccumulative constituents that may present a risk to humans through the aquatic environment.

## Ecological Risk

The Site is highly developed and lacks riverbank habitat and supports no upland receptors. To identify potential risks to aquatic and aquatic-dependent receptors from the Site, a screening evaluation was completed using data collected during the RI for erodible soils, upland sediment, surface water, and groundwater.

Potential impacts to the Willamette River were assessed using a screening evaluation against the Portland Harbor JSCS SLVs. Portland Harbor JSCS SLVs summarize the chemical concentrations indicative of elevated risk to ecological receptors based on scientific research and literature. USEPA interprets concentrations above JSCS SLVs to be indicative of conditions causing negative impact to ecological receptors in the Willamette River. The JSCS SLVs were used within the FS as screening values to represent risk uncertainty until the USEPA Portland Harbor ROD establishes contaminant specific cleanup levels based on identified Applicable or Relevant and Appropriate Requirements (ARARs) or risk-based levels. The results from the screening evaluation indicate that the groundwater and erodible soils at the Moorings are likely contributing contaminants to the Willamette River. Since source control has not yet been addressed at GASCO, the impact of groundwater on ecological receptors and river sediments is not addressed in this Action Memorandum.

Erodible soil COPC constituents identified by this screening process include:

- PAHs – flouranthene, pyrene, benzo(a)anthracene, chrysene, indeno(1,2,3-cd)pyrene, benzo(g,h,i)perylene, di-n-butyl phthalate, bis (2-Ethylhexyl)phthalate
- PCBs - Aroclor 1248, total PCBs
- Pesticides – DDD, DDT, total DDx, total Endosulfan
- Metals – arsenic, cadmium, chromium, copper, lead, manganese, mercury, nickel, zinc

This proposed removal action will reduce the potential for contaminated erodible soil from entering the Willamette River and potentially causing deleterious impacts to ecological receptors in the river. This will be achieved by implementing a near-shore bank design that prevents erodible soils from accumulating, and being transported to the water along the Willamette River bank located on the Moorings property. The erodible soils are found at the top of the bank along the Fence Line and in the North Logistics Area near the warehouse. Since this action is based on implementation of an engineered solution that prevents erodible soils from entering the river, post-remedy confirmation sampling will not be required for the erodible soils.

## **5. NPL Status**

USEPA has named the USACE a Potentially Responsible Party for the Portland Harbor NPL site due to contributions of contamination to the Willamette River and sediment contamination at the Moorings property. This action is proposed to alleviate sources of contamination from the Moorings facility. The removal action proposed at the Moorings site is being conducted by the USACE as the lead federal agency, consistent with CERCLA and as delegated in Executive Order (E.O.) 12580, Superfund Implementation. Under E.O. 12580, certain federal agencies, including the Department of Defense, are allowed to conduct removal actions, including non-time-critical removal actions, at federal sites under that agency's jurisdiction, custody, or control.

## **6. Maps, Pictures, and Other Graphic Representations**

Relevant figures and tables are attached to this memorandum.

### **B. Other Actions to Date**

#### **1. Previous Actions**

The RI documents previous investigation and cleanup actions on site with respect to soil cleanups. These actions include:

- A sandblast grit removal in surface soil in 1993.
- A petroleum contaminated soil removal in 1993.

Since the RI, one removal related to surface soil has been performed. In 2011, a dry well for surface water collection and associated sediments was removed from the site.

The RI documents risks to human health or the environment from groundwater and from potentially erodible soils. An FS was prepared to address the risks identified in the RI.

## **2. Current Actions**

For the proposed removal action, the 2012 FS serves as the functional equivalent to the Engineering Evaluation and Cost Analysis (EE/CA) required under a non-time-critical removal action. A public notice with a 30-day public comment period was advertised. The design for this action will proceed after approval of this Action Memorandum.

USACE is implementing ICs for groundwater use on site as recommended by the FS. USACE is working with regulatory agencies to require NW Natural (the current owners of the GASCO site) to include the Moorings groundwater remedy in the active groundwater remedy NW Natural is implementing at the neighboring GASCO site. In-water sediment remedy issues are being addressed as part of the Portland Harbor sediment NPL RI/FS process and Record of Decision.

### **C. State and Local Authorities' Role**

The USACE is assuming the role as lead federal agency for the upland remedy. The USEPA is the lead federal agency for the in-water portion of the Portland Harbor NPL Site and has been reviewing all actions at the Moorings for source control to the Willamette River. As the lead federal agency for the site, USACE will complete the soil removal action consistent with applicable CERCLA requirements and with EPA review. The ODEQ serves as the primary regulatory point of contact for non federal parties for upland source control at the Portland Harbor NPL Site.

#### **1. State and Local Actions to Date**

The ODEQ is leading upland source control actions in the Portland Harbor NPL site except for those actions at federal sites. ODEQ has assisted USACE in evaluating groundwater impacts from GASCO on the Moorings.

The Portland Harbor Site has a large and active regulatory, environmental trustee, tribal and public community of involved partners led by the USEPA. The USEPA has led the review and coordination of other federal agencies, state agencies, tribes, and local community advisory group for the NPL Site. USACE has utilized the USEPA regulatory and community involvement process through its upland RI and FS process.

Once a removal action was recommended, USACE prepared a Community Involvement Plan. USACE prepared a fact sheet and presented the findings of the FS and the proposed removal action to the Portland Harbor Community Advisory Group in July of 2012. A responsiveness summary to community and other reviewers' comments is attached to this memorandum.

Other federal agencies, including the National Marine Fisheries Service (NMFS) and U.S. Fish and Wildlife Service (USFWS), have participated through the USEPA harbor wide process in reviewing and commenting on documents associated with the Moorings Site. However, because of its relatively small impact to the larger harbor site, the Moorings has not received much attention from any of the interested regulators, trustees, tribes, or community groups.

### **III. THREATS TO PUBLIC HEALTH OR WELFARE OR THE ENVIRONMENT, AND STATUTORY AND REGULATORY AUTHORITIES**

#### **A. Threats to Public Health or Welfare**

Exposure for human receptors from erodible soils is limited to the effects to surface water and sediment from erosion of contaminated soils and the effect on the aquatic environment through food web transport. This risk is considered low and this action is not being taken in response to a specific threat to human health.

#### **B. Threats to the Environment**

Potential risks to aquatic and aquatic-dependent receptors from the Site were assessed using a screening evaluation using data collected during the RI for erodible soils. A complete analysis of risks to the riverine environment will be completed in the Portland Harbor RI/FS. Until that risk assessment is complete, source control to the riverine environment is controlled harbor wide using the Portland Harbor JSCS SLVs.

The *Willamette River Inventory* (Portland Bureau of Planning 2002) and the *Willamette Watershed Characterization Report* (Portland Bureau of Environmental Services 2006) describe the habitats in the Lower Willamette River. In the *Willamette River Inventory*, the lower Willamette River was divided into segments and reaches. The North Segment, Doane Lake Reach (RM 6-7.5) encompasses the area of the Moorings and is dominated by industrial properties with unconnected wetlands with low ranking habitat values.

Minimal vegetation exists along the margins of the Willamette River and the river bank is either reveted with stone or unclassified fill at the Moorings. The wooden docks provide habitat for predatory fish. The river bank at the toe of the slope at the removal area is sandy beach leading to about 2 acres of shallow water habitat. Ecological receptors that may be present within the boundaries of the removal action area include fish (salmonids and demersal fish), birds, aquatic mammals, and aquatic (free-swimming) and benthic invertebrates.

A number of native and non-native fish species are present in the Lower Willamette River (LWR). Farr and Ward (1993) found a total of 39 fish species from 17 families, with 19 introduced species from 7 families. Four species of salmonids found in the lower river are listed as threatened under the ESA. They include steelhead (*Oncorhynchus mykiss*), Chinook salmon (*O. tshawytscha*), coho salmon (*O. kisutch*), and chum salmon (*O. keta*). The LWR channel is primarily used as a migratory corridor by adult and juvenile salmonids, while tributaries are utilized for spawning and rearing. The ESA-listed salmonid species and their use of the project area are documented in the Preliminary Draft Biological Assessment prepared for the Portland Harbor RI/FS. Other species of social or economic importance in the LWR include white sturgeon (*Acipenser transmontanus*), American shad (*Alosa sapidissima*), and Pacific lamprey (*Lampetra tridentata*).

Potential exposure scenarios for ecological receptors (as generic categories) are summarized below.



- Fish and aquatic invertebrates coming in contact with groundwater discharging to surface water in the nearshore environment
- Benthic invertebrates residing in contact with impacted sediment in the vicinity of the Moorings.
- Ingestion of benthic invertebrates, sediment, and surface water by forage fish
- Ingestion of fish and surface water by piscivorous fish
- Ingestion of benthic and aquatic biota (e.g., piscivorous fish, forage fish, and benthic invertebrates) and incidental ingestion of sediment and surface water by aquatic-dependent wildlife

Resident fish would spend much more time within the area of impacted sediments than anadromous fish. As a result, resident fish would be more affected by contaminated sediment at the site than anadromous fish.

#### **IV. ENDANGERMENT DETERMINATION**

Actual or threatened releases of hazardous substances, pollutants, and contaminants from this site, if not addressed by implementing the response action selected in this Action Memorandum, may present an imminent endangerment to public health, or welfare, or the environment.

#### **V. PROPOSED ACTIONS AND ESTIMATED COSTS**

##### **A. Proposed Actions**

##### **1. Proposed Action Description**

The proposed removal action consists of a vegetative buffer placed over any exposed erodible soils and installation of necessary stormwater drainage and treatment systems. Prior to placement of the buffer, the top 6 inches of contaminated soil will be removed, transported and disposed as non-hazardous waste and replaced with six inches of clean topsoil. The area would be monitored as part of the Moorings general O&M requirements to verify that the vegetative buffer is working sufficiently to reduce runoff and prevent erodible soil from accumulating or leaving the Site. The proposed removal action is shown in Figure 3.

A more detailed discussion of the alternative tasks as described in the Feasibility Study is as follows:

##### **Vegetative based storm water erosion control measures at the North Logistics and Fence Line Management Units (MU)**

- Remove fence in Fence Line and North Logistics MU.
- Remove, transport and dispose of top six inches of contaminated soil
- Install French drain ten feet landward of North Logistics MU bank top (if required)
- Install and maintain stormwater metals treatment for French drain effluent (if required)
- Install concrete curb along North Logistics MU to stabilize gravel placement

- Raise grade of North Logistics MU using clean topsoil near bank and gravel beyond ten feet of bank
- Place six inches clean topsoil in Fence Line MU near bank
- Plant vegetative buffer (ten feet wide) using grass and shrubs less than eight inches tall as defined by the Portland Plant List (Portland 2004a)
- Replace fence at new grade in North Logistics and Fence Line MU
- Incorporate temporary sediment control measures (filtration silt/sediment fence) until vegetative buffer becomes effective
- Monitor erosion control measures
- Monitor effluent from storm water metals treatment for French drain effluent - one location, quarterly (if required)

## **2. Contribution to Remedial Performance**

The soil cleanup will contribute to any future remedial actions by permanently removing the most potentially erodible impacted soil from the site and treating surface water runoff from any remaining contaminated soil. The proposed action would be compatible with any potential future remedial action that may be selected for the site and would not affect the ability to conduct any removal or remedial actions that may be selected for the in-water sediments at the Moorings.

## **3. Description of Alternative Technologies**

The FS discusses the remedial options and technologies that were assembled and screened in order to develop the four removal action alternatives identified and evaluated for erodible soils.

## **4. Engineering Evaluation and Cost Analysis/ Feasibility Study**

The USACE prepared a FS to address groundwater and erodible soil at the Moorings site. After USACE decided to proceed with a soil removal action, an EE/CA was not prepared since the FS provides the functional equivalent of an EE/CA to document the development and evaluation of removal action alternatives, and discuss the rationale for the recommended alternative for erodible soil.

Remedial options and technologies were assembled and screened in order to form the four removal action alternatives identified and evaluated in the FS. Remedial options were first considered in terms of broad general categories referred to as general response actions (GRAs). The GRAs potentially applicable to the Moorings erodible soil removal action include the following:

- No Action
- Removal, Transport, and Disposal
- Monitoring
- Monitored Natural Attenuation (MNA)
- Land Use Controls (LUCs)
- Other Controls

- Treatment
- Containment
- Stormwater Collection, Erosion Control, and Treatment Measures

From these GRAs, a range of process options relevant to the Moorings erodible soil were considered and screened on the basis of effectiveness, implementability, and to a lesser extent cost.

The following GRAs were carried forward to Remedial Action Alternative development

- No action
- LUCs
- Removal, Transport, and Disposal
- Monitoring
- Stormwater Collection, Erosion Control, and Treatment Measures

Feasible remedial options were then assembled into the following four removal action alternatives selected for more detailed analysis.

Alternative 1 – No Action

Alternative 2 – Gravel Layer: Land Use Controls, Gravel Placement, & Limited Stormwater Collection, Erosion Control, Stormwater Treatment, Monitoring & Erodible Soils Monitoring

Alternative 3 – Limited Concrete Cap: Land Use Controls, Concrete Cap, Stormwater Collection, Erosion Control, Stormwater Treatment, Monitoring & Erodible Soils Monitoring

Alternative 4 – Vegetative Buffer: Land Use Controls, Erodible Soil Removal, Construction of Vegetative Buffer, Limited Stormwater Collection, Stormwater Treatment, Monitoring & Erodible Soil Monitoring

These removal action alternatives were evaluated in terms of the CERCLA Threshold Criteria of protectiveness, compliance with ARARs, long and short term effectiveness, reduction of toxicity, mobility, or volume of contaminants through treatment, implementability, and cost. Table 1 summarizes the comparative analysis of alternatives against the remedial action objective of reducing the potential for erodible soils above JSCS SLVs from entering the Willamette River.

Alternative 4 was selected as the preferred alternative over the other alternatives because this alternative promotes a sustainable option as compared with the concrete cap which requires substantial infrastructure, and the gravel layer which will require continuous gravel placement over time. The vegetative barrier will work to filter stormwater, thereby removing sediments before they enter the Willamette River. The vegetative barrier will reduce erosion along the bank through incorporation of vegetative surface covers and soil stabilizing plants that prevent

erosion through the maturation of complex root systems. In addition, the vegetative buffer will also provide potential phytoremediation characteristics (both contaminant destruction or immobilization) for stormwater and contaminated soils within the vicinity of the root systems of the cover. Through self reseeding, the buffer will provide a long-term solution for erodible soils at the Moorings. The USACE and USEPA believe the preferred alternative (alternative 4) would be protective of human health and the environment, comply with ARARs, be cost-effective, and would utilize permanent solutions and alternative treatment technologies to the maximum extent possible.

The FS was made available for public comment from July 21 through August 20, 2012. Following the public comment period, the FS was not revised. No comments were received as noted in the responsiveness summary attached to this memorandum.

## **5. Applicable or Relevant and Appropriate Requirements**

This section describes the potential applicable or relevant and appropriate requirements (ARARs) identified for the removal action. Removal actions must attain potential ARARs to the extent practicable, considering site-specific circumstances, including the urgency of the situation, the scope of the removal action, and impact of potential ARARs on cost and duration of the removal action 40 CFR §300.415(9)(j). Potential ARARs are presented in Table 2 “Potential Chemical-Specific ARARs and TBCs”.

No federal, state, or local permits are required for removal actions conducted entirely on site. CERCLA §121(e), 42 U.S.C. §9621(e), and 40 CFR §300.400(e)(1). On-site removal actions must meet only the substantive requirements, not administrative requirements, of potential ARARs. Administrative requirements, such as permits, reports, and records, along with substantive requirements, apply only to hazardous substances sent off site for further management. The substantive requirements identified as potential ARARs for the Moorings site removal action were based upon an evaluation of federal environmental laws and more stringent state environmental and facility siting laws.

Alternatives 2, 3, and 4 comply with interim ARARs through stormwater erosion control measures for the Site locations that have a potential for erosion of contaminated soils into the Willamette River. Such actions will comply with water quality standards and other provisions of the Clean Water Act. If a French drain system is installed as a Remedial Action, a Filterra Bioretention system will be installed to ensure any discharge generated by the action meet provisions of the Clean Water Act. Filterra systems would be installed down gradient along the slope or at the base of the bank. Alternatives 2, 3, and 4 are all ranked moderately compliant with ARARs.

## **6. Project schedule**

The proposed removal action is expected to take a few weeks to complete. Removal action construction is scheduled to be completed by October 2013. Work will be conducted during the Willamette River in-water work window of July 15 to October 31. Removal work is not expected to impact the in-water environment, but the stormwater treatment system may be placed below the ordinary high water mark.

The removal action design will be completed during the fall and winter of 2012/2013 and a solicitation will be offered for a 1 June 2013 award target. The removal action design will be completed during the fall and winter of 2012/2013 and a solicitation will be offered for a 1 June 2013 award target. After informal consultation with NMFS and USFWS, the Corps has made a "no effect" determination for ESA species found in the Willamette River and for their Critical Habitat. Because all of the work is to be done above the ordinary high water line, NMFS and USFWS were in agreement that with appropriate silt fencing and use of Best Management Practices by the contractor, there would be no impact to the adjacent surface water. The construction contract will include language that makes the use of silt fencing and BMPs a requirement for all construction on the site.

## **B. Estimated Costs**

An engineer's cost estimate for the proposed removal action (Alternative 4) is presented in Table 3. This cost estimate was prepared for the FS and will be refined as the design progresses. FS-level cost estimates are considered order-of-magnitude; i.e., the estimated costs are expected to be within -30 to +50 percent of the actual costs of the completed projects, as recommended in USEPA guidance on developing and documenting cost estimates (USEPA 2000, Attachment 2). Costs are based on 2012 dollars, without adjustments for inflation. The validity of these costs is subject to the assumptions used in the development of the removal action alternatives. Contingencies, which are comprised of unlisted costs, are based on engineering judgment and experience. Because of the accuracy level intended, the primary use of these estimates was to allow comparison between alternatives during the selection process, not for establishing project budgets.

Because the proposed removal action involves the physical removal of only the most significantly impacted soils, long-term periodic monitoring is included in this alternative. Ongoing monitoring costs for this alternative includes routine operation and maintenance of the surface water treatment system. The estimated total present-worth cost including 30 years of monitoring, assuming a real discount rate of 3.5 percent, is \$1,129,891.

Following the removal action, additional actions related to groundwater contamination will be conducted. USACE is currently in discussion with USEPA, ODEQ, and NW Natural to accomplish this effort. A final upland ROD for the Site will include this soil removal and the groundwater remedy completed by others.

## **VI. EXPECTED CHANGE IN THE SITUATION SHOULD ACTION BE DELAYED OR NOT TAKEN**

If the action is delayed or not taken, contamination will continue to have the potential to adversely affect the riverine environment. Delayed action will increase environmental risks through prolonged exposure of the environment to metals, PCBs and pesticides. Contaminated soils from the "source areas" may be transported off site through natural erosional processes, potentially increasing risks to the environment and complicating future remedial efforts. Contaminated source areas must be addressed prior to a decision on the Portland Harbor sediment remedy, which is scheduled for 2014.

## **VII. OUTSTANDING POLICY ISSUES**

There are no outstanding policy issues.

## **VIII. ENFORCEMENT**

There is no enforcement action associated with this removal action. The removal action described herein is being conducted by the USACE as the lead federal agency.

## IX. RECOMMENDATION

This decision document represents the selected removal action for the Moorings site, developed in accordance with CERCLA, as amended, and not inconsistent with the NCP. This decision is based on the administrative record for the site.

Conditions at the site meet the NCP 40 CFR§300.415(b)(2) criteria for a removal and I recommend your approval of the proposed removal action.

APPROVED

DISAPPROVED

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

Hon. Jo-Ellen Darcy  
Assistant Secretary of the Army (Civil Works)

## ABBREVIATIONS AND ACRONYMS

ARAR	applicable or relevant and appropriate requirement
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CRD	Columbia River Datum
COC	contaminant of concern
COPC	contaminant of potential concern
EE/CA	engineering evaluation and cost analysis
EFH	essential fish habitat
ESU	evolutionarily significant unit
FS	feasibility study
GRA	general response action
HHRA	human health and risk assessment
IC	Institutional Control
JSCS SLV	Joint Source Control Strategy Screening Level Values
MCL	Maximum Contaminant Level
MGP	Manufactured Gas Products
µg/kg	microgram per kilogram
mg/kg	milligram per kilogram
msl, MSL	mean sea level
MIS	multi-increment sampling
MU	management unit
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NMFS	National Marine Fisheries Service
NPL	National Priorities List
ODEQ	Oregon Department of Environmental Quality
ODFW	Oregon Department of Fish and Wildlife
PCB	polychlorinated biphenyl
PFMC	Pacific Fishery Management Council
PRG	Preliminary Remediation Goals
RI	remedial investigation
RI/FS	remedial investigation/feasibility study
RM	river mile
ROD	Record of Decision
SDWA	Safe Drinking Water Act
TBC	to-be-considered
URS	URS Corporation
USACE	U.S. Army Corps of Engineers
U.S.C.	United States Code
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service



## **LIST OF FIGURES, TABLES, AND ATTACHMENTS**

### **Figures**

Figure 1 – Site Map

Figure 2 – Site Layout

Figure 3 – Proposed Removal Action

### **Tables**

Table 1 – Comparative Analysis of Alternatives

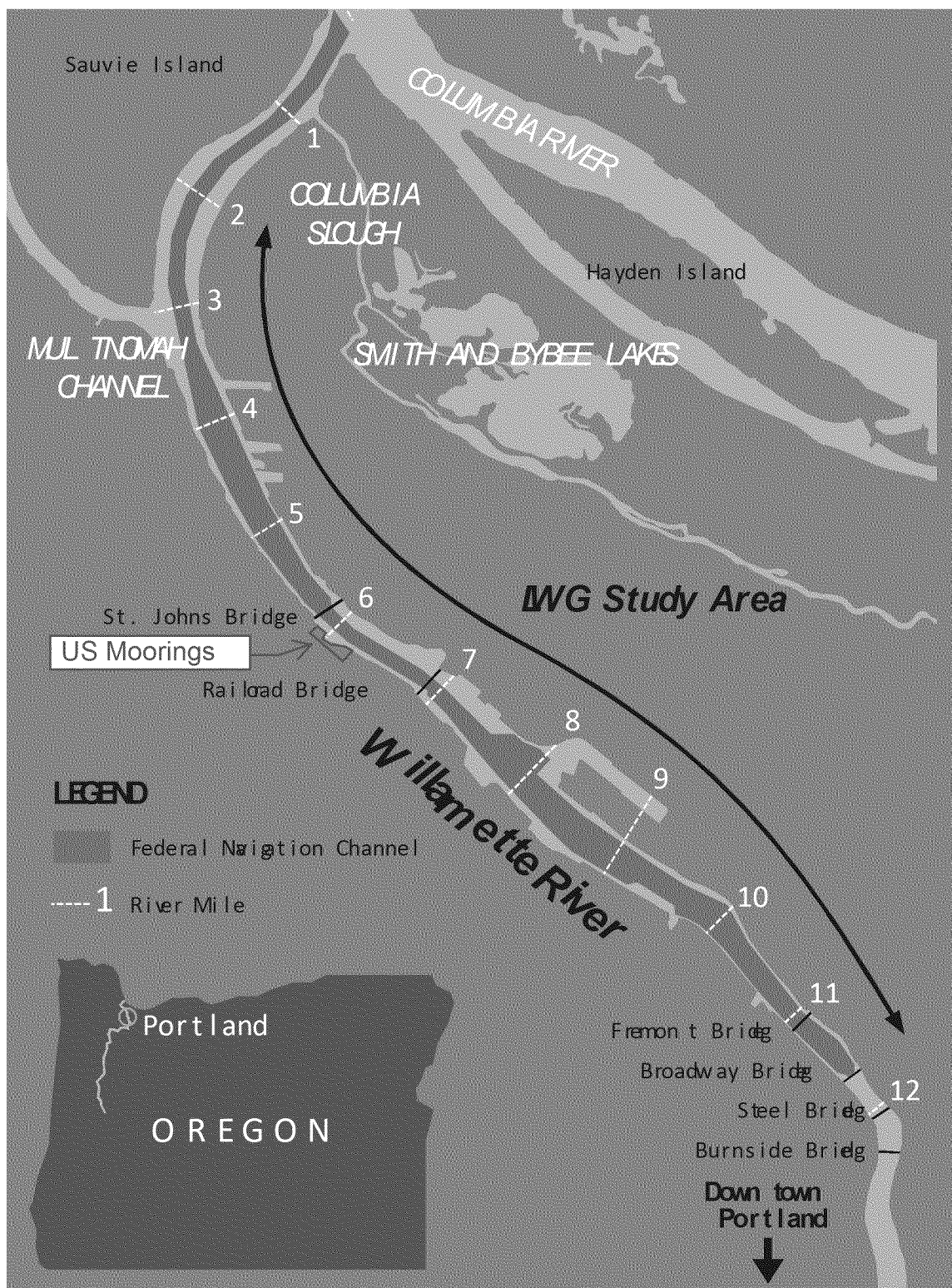
Table 2 – Potential ARARs and TBCs

Table 3 – Summary of Alternative Costs

### **Attachments**

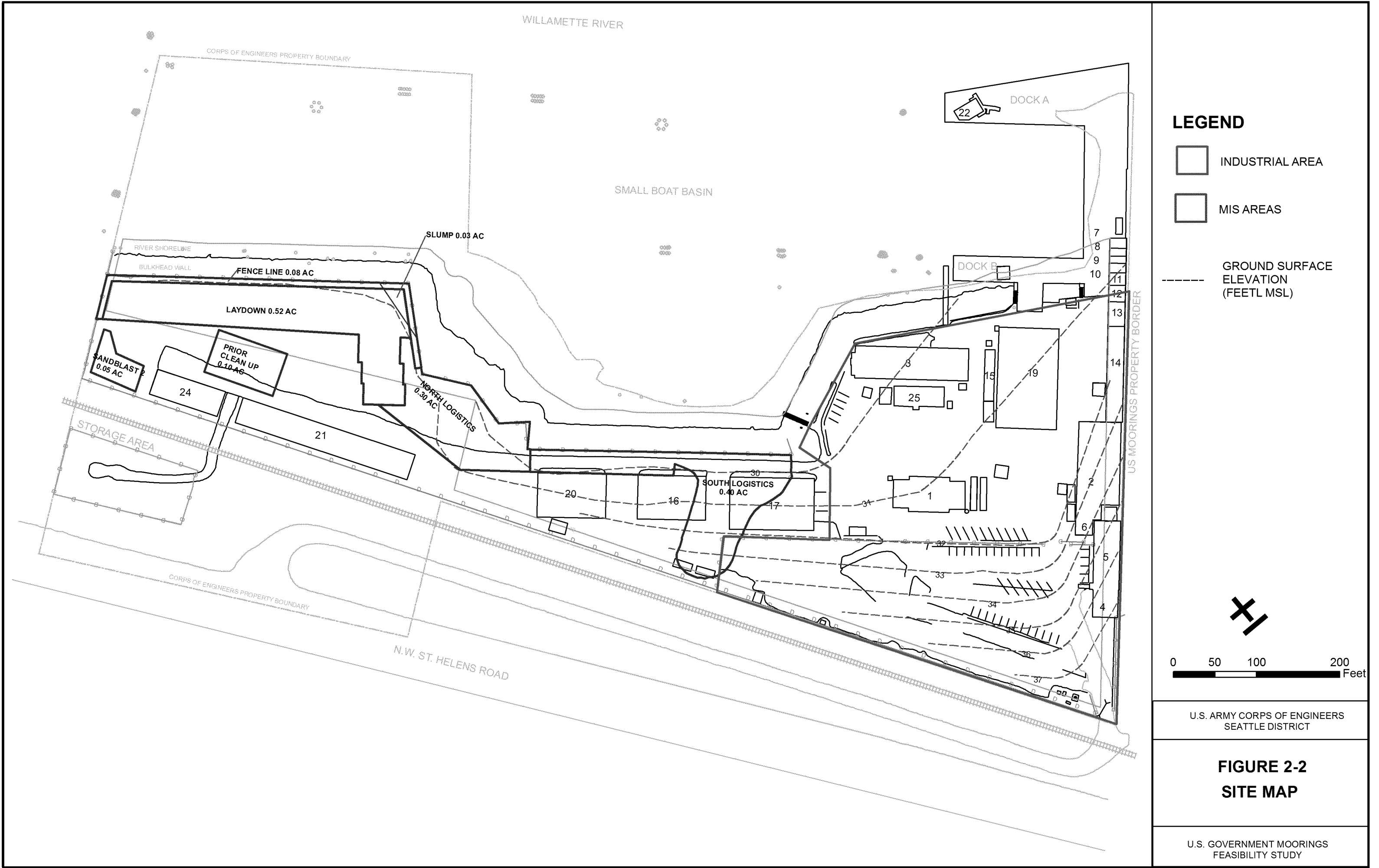
Attachment 1 – Responsiveness Summary

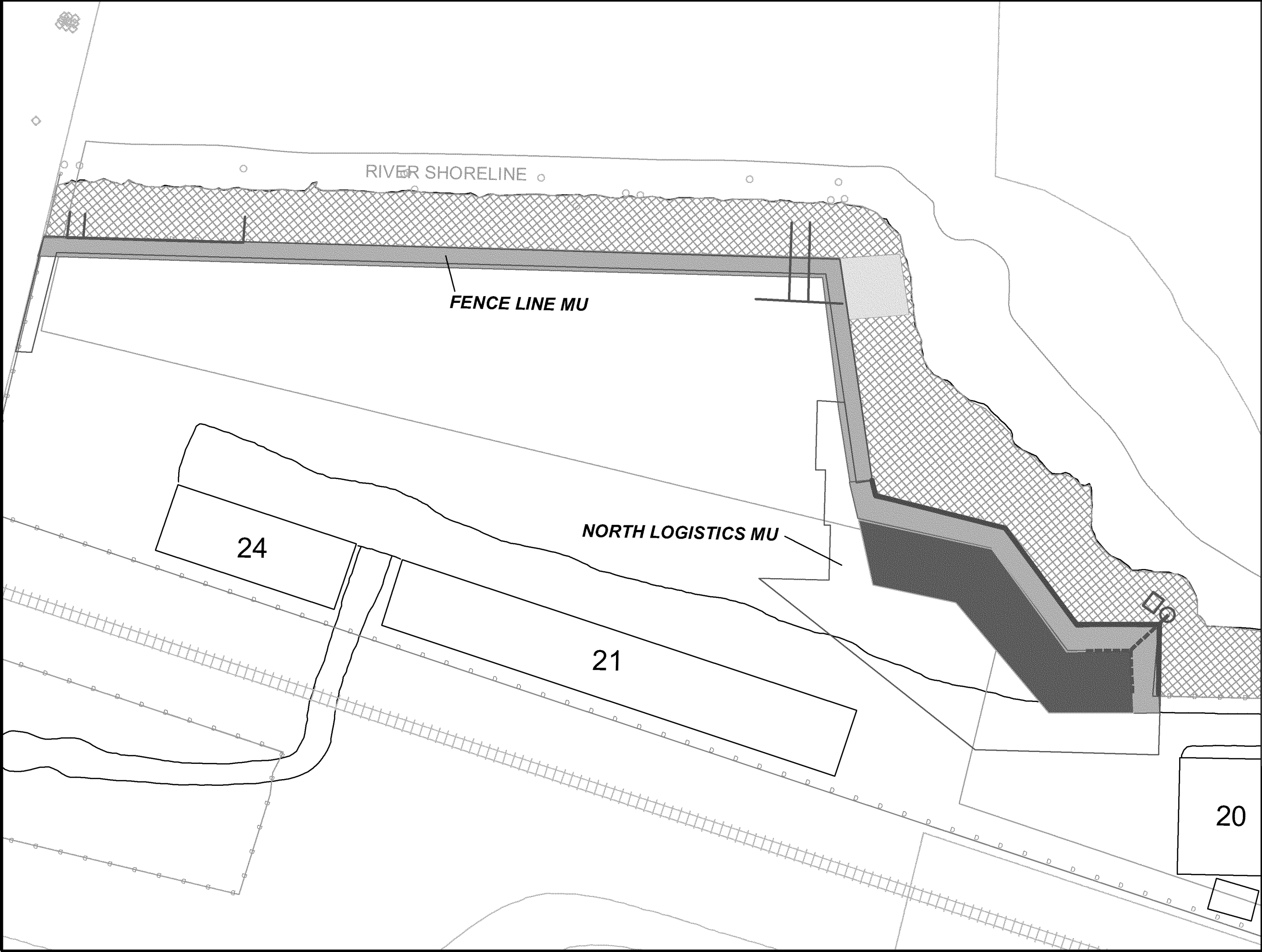
Attachment 2 - References



Base map: Portland Harbor Feasibility Study

Figure 1  
Vicinity Map





**LEGEND**

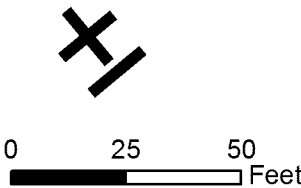
MANAGEMENT UNIT (MU)

**BANK MATERIAL**

CONCRETE PAD  
RIP-RAP

**ALTERNATIVE 4**

EXISTING FRENCH DRAINS  
PROPOSED FRENCH DRAIN INCLUDES PASSIVE TREATMENT FOR METALS (AS NEEDED)  
TREATMENT SYSTEM AND OVERFLOW CATCH BASIN  
VEGETATIVE BUFFER  
FILL TO GRADE AND COVER WITH GRAVEL  
CONCRETE CURB



U.S. ARMY CORPS OF ENGINEERS  
SEATTLE DISTRICT

**FIGURE 6-4  
ALTERNATIVE 4  
(OU 2)**

U.S. GOVERNMENT MOORINGS  
FEASIBILITY STUDY

Figure 3

Table 1 Comparative Ranking of Alternatives

	Alternative 1	Alternative 2	Alternative 3	Alternative 4
	No Action	Gravel Layer	Limited Concrete Cap	Vegetative Buffer
Threshold Criteria	RAO 2	RAO 2	RAO 2	RAO 2
Protection of Human Health & Environment	Not Protective	Moderately Protective	Most Protective	Most Protective
Compliance with ARARs	Not Compliant	Compliant	Compliant	Compliant
Short-Term Effectiveness	Least Effective	Most Effective	Most Effective	Moderately Effective
Long-Term Effectiveness	Least Effective	Moderately Effective	Moderately Effective	Most Effective
Reduction of Toxicity, Mobility, & Volume through Treatment	No Reduction Capacity	Least Reduction	Moderate Reduction	Most Reduction
Implementability	No Requirement	Most Implementable	Least Implementable	Moderately Implementable
Cost	No Cost	Least Cost	Most Cost	Moderate Cost

Table 2. Potential ARARs and TBCs

Regulation	Citation	Criteria/Standard	Chemical Specific	Location Specific	Action Specific	Applicability/Appropriateness
Federal ARARs						
Clean Water Act,	33 USC 1313, 1314 Most recent 304(a) list, as updated up to issuance of the ROD	Under Section 304(a), minimal criteria are developed for water quality programs established by states. Two kinds of water quality criteria are developed: one for protection of human health, and one for protection of aquatic life.	X		X	POTENTIALLY SELECTED. Relevant and appropriate for cleanup standards for surface water and contaminated groundwater discharging to surface water if more stringent than promulgated state criteria. Relevant and Appropriate to short-term impacts to surface water from implementation of the remedial action that result in a discharge to navigable water, such as dredging and capping if more stringent than promulgated state criteria.
Clean Water Act, Section 402	33 USC 1342	Regulates discharges of pollutants from point sources to water of the U.S., and requires compliance with the standards, limitations and regulations promulgated per Sections 301, 304, 306, 307, 308 of the CWA.	X			POTENTIALLY SELECTED. Relevant and Appropriate to remedial activities that result in a discharge of pollutant from point sources to the river if more stringent than state promulgated point source requirements. The site is under NPDES Permit #1436GEN12Z.
Safe Drinking Water Act	42 USC 300f, 40 CFR Part 141, Subpart O, App. A. 40 CFR Part 143	Establishes national drinking water standards and MCLs to protect human health from contaminants in drinking water	X			POTENTIALLY SELECTED. Relevant and appropriate as a performance standard for groundwater and surface water which are potential drinking water sources. While not an ARAR or cleanup standard for USACE actions at the site, it may be identified as an ARAR for the Gasco cleanup.

Federal ARARs

Table 2. Potential ARARs and TBCs

Regulation	Citation	Criteria/Standard	Chemical Specific	Location Specific	Action Specific	Applicability/Appropriateness
River and Harbors Act	33 USC 401 et seq. 33 CFR parts 320 to 323	Section 10 prohibits the unauthorized obstruction or alteration of any navigable water. Structures or work in, above, or under navigable water are regulated under Section 10.			X	POTENTIALLY SELECTED. Applicable requirements for how remedial actions are taken or constructed in or above the navigation channel. This would only be an ARAR if the remedy requires construction of a structure that would obstruct or hinder navigable water.
Toxic Substance Control Act	15 USC § 2605 et seq.	Regulation of hazardous chemical substances and mixtures.	X			POTENTIALLY SELECTED. Substantive requirements of TSCA related to soil remediation/disposal are applicable to contaminated material or surface water with PCB contamination
Migratory Bird Treaty Act	16 USC § 703 50 CFR § 10.12	Makes it unlawful to take any migratory bird. "Take" is defined as pursuing, hunting, shooting, poisoning, wounding, killing, capturing, trapping and collecting.			X	POTENTIALLY SELECTED. Applicable to remedial actions that have the potential to affect a taking of migratory birds.
Endangered Species Act	16 USC 1531 et seq. 50 CFR 17, § 4(d)	Actions authorized, funded, or carried out by federal agencies may not jeopardize the continued existence of endangered or threatened species or adversely modify or destroy their critical habitats. Agencies are to avoid jeopardy or take appropriate mitigation measures to avoid jeopardy.			X	POTENTIALLY SELECTED. Remedies on the upland portion of the Moorings may impact listed species in the Willamette River via discharges from the French drains. Only substantive requirements are ARARs. Administrative/procedural requirements such as formal consultations are not required.
State ARARs						



Table 2. Potential ARARs and TBCs

Regulation	Citation	Criteria/Standard	Chemical Specific	Location Specific	Action Specific	Applicability/Appropriateness
Oregon Environmental Cleanup Law ORS 465.315	Oregon Hazardous Substance Remedial Action Rules OAR 340-122-0040 and 0115	Sets standards for degree of cleanup required, including for oil and other petroleum products/wastes. Establishes acceptable risk levels for human health and $1 \times 10^{-6}$ for individual carcinogens, $1 \times 10^{-5}$ for multiple carcinogens, and Hazard Index of 1 for non-carcinogens; and protection of ecological receptors at the individual level for threatened or endangered species and the population level for all others.	X		X	POTENTIALLY SELECTED. A risk-based numerical value that, when applied to site-specific conditions, will establish concentrations of hazardous substances that may remain or be managed on-site in a manner avoiding unacceptable risk. Only substantive requirements apply. Acceptable risk range for cleanups must remain consistent with CERCLA risk range of $10^{-4}$ to $10^{-6}$ .
		For hot spots of contamination in water, requires treatment, if feasible, to concentrations avoiding significant adverse impacts to beneficial uses.			X	POTENTIALLY SELECTED. Relevant and appropriate treatment requirement for groundwater which meet the State's definition of a hotspot. While not an ARAR or cleanup standard for USACE actions at the site, it may be identified as an ARAR for the Gasco cleanup.



Table 2. Potential ARARs and TBCs

Regulation	Citation	Criteria/Standard	Chemical Specific	Location Specific	Action Specific	Applicability/Appropriateness
Solid Waste: Oregon General Provisions	Solid Waste: Land Disposal Sites Other than Municipal Solid Waste Landfills, specific regulatory references to be supplied by ODEQ	Requirements for the management of solid wastes at land disposal sites other than municipal solid waste landfills.			X	POTENTIALLY SELECTED. Applicable to the on-site management and disposal of contaminated, soil and/or groundwater. Only substantive requirements apply.
Water Pollution Control Act ORS 468B.048	Water Quality Standards OAR 340-041-0001 and 340-041-0340,	DEQ is authorized to administer and enforce the CWA program in Oregon. DEQ rules designate beneficial uses for water bodies and narrative and numeric water quality criteria necessary to protect those uses. OAR 340-041-0340 designates beneficial uses that shall be protected in the Willamette Basin.	X		X	POTENTIALLY SELECTED. Applicable to any discharges to surface water from point sources, groundwater, overland flow of stormwater, and activities that may result in discharges to waters of the state. Only those state standards more stringent than federal standards are ARARs.
Water Pollution Control Act ORS 468B.048	Regulation Pertaining to NPDES Discharges 340-018-0010	Effluent limitations and management practices for point-source discharges into water of the State (otherwise subject to NPDES permit but for on-site permit exemption).	X		X	POTENTIALLY SELECTED. Applies to State water quality standards and effluent limitations to point-source discharges to the Willamette River. Only substantive requirements apply.

Table 3. Summary of Alternative 4 Costs

Alternative Description of Primary Action	Capital Costs	Total Remedial Design Costs	Total Periodic Costs	Total O&M Costs	Total Marked-Up Costs (w/o escalation)	Present Value Costs
Alternative 4	\$124,960	\$18,744	\$162,661	\$1,250,971	\$1,557,336	\$1,129,891
Five Year Review	-	-	\$162,661	-	\$162,661	\$104,708
Metals Treatment System Monitoring (Filtterra)	-	-	-	\$1,244,707	\$1,244,707	\$877,173
Metals Treatment System Install (Filtterra)	\$15,000	\$2,250	-	\$6,264	\$23,514	\$21,556
Alt 4 - Vegetative Buffer	\$109,960	\$16,494	-	-	\$126,454	\$126,454

Key:

O&M

operation and maintenance

w/o

without

**ATTACHMENT 1**  
**Responsiveness Summary**

No Comments were received during public review.

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## ATTACHMENT 2

### References

Executive Order - 12580 Superfund Implementation, Jan. 23, 1987, 52 FR 2923, 3CFR 1987

OSWER Publication 9360.0-32, Guidance on Conducting Non-Time Critical Removal Actions under CERCLA, 2009

USACE 2012, Final Uplands Feasibility Study Report, U.S. Government Moorings, Portland, Oregon, April 2012

KTA/TEC 2010, Final Remedial Investigation Report, U.S. Government Moorings, Portland, Oregon, May 2010

*The Willamette River Inventory* (Portland Bureau of Planning, 2002)

*Willamette Watershed Characterization Report* (Portland Bureau of Environmental Services, 2006)